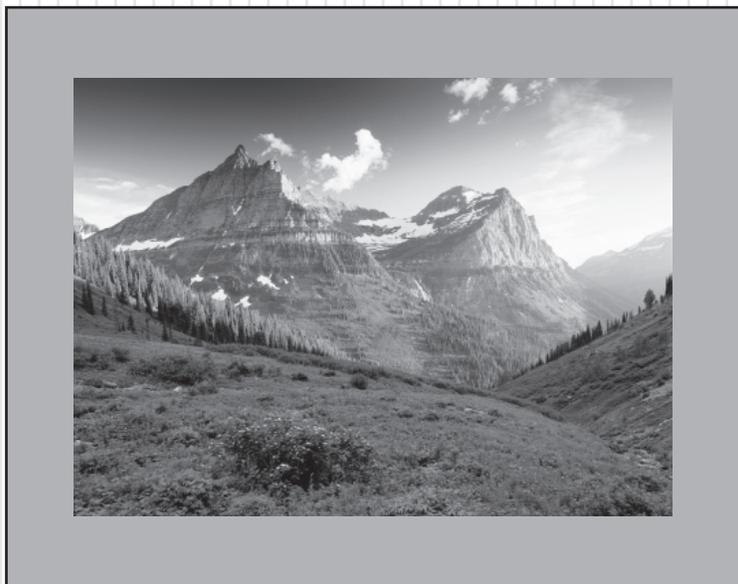


*Montana*  
*Comprehensive Assessment*  
*System (MontCAS, Phase 2)*  
*Criterion-Referenced Test (CRT)*

COMMON CONSTRUCTED-RESPONSE ITEM RELEASE  
MATHEMATICS, GRADE 8

2007



**OPI**

OFFICE OF PUBLIC INSTRUCTION

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# Mathematics

## Session 1 (Calculator)

**You may use a calculator during this session.**

25. The frequency table below shows the number of ounces of water each member of a health class reportedly consumes on a normal day.

**Daily Water Consumption**

<b>Number of Ounces of Water</b>	<b>Frequency</b>
8	2
16	4
24	3
32	3
40	2
48	1
56	1

- How many members are in the health class? Show or explain how you found your answer.
- What is the median number of ounces of water consumed by members of the health class? Show or explain how you found your answer.
- What is the mean number of ounces of water consumed by members of the health class? Show or explain how you found your answer.

## Scoring Guide

Score	Description
4	5 points
3	$3\frac{1}{2} - 4\frac{1}{2}$ points OR 3 points provided at least one point from each of parts b and c.
2	$1\frac{1}{2} - 3$ points
1	$\frac{1}{2}$ or 1 point
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

### Scoring Notes

Part a: 1 point	for correct answer, <b>16 (members)</b> , with correct work or explanation OR
$\frac{1}{2}$ point	for correct answer with incomplete or no work or explanation or for correct strategy that may have one computational error
Part b: 2 points	for correct answer, <b>24 (ounces) or correct based on incorrect part a</b> , with correct work or explanation OR
1 point	for correct answer with incomplete or no work or explanation or for correct strategy that may have one minor error OR
$\frac{1}{2}$ point	finds the median without considering the frequency, 32 (ounces)
Part c: 2 points	correct answer, <b>27 (ounces) or correct based on incorrect part a</b> , with correct work or explanation OR
1 point	for correct answer with incomplete or no work or explanation or for correct strategy that may have one computational error OR
$\frac{1}{2}$ point	finds the mean without considering the frequency, 32 (ounces)

**Sample Response:**

Part a:  $2 + 4 + 3 + 3 + 2 + 1 + 1 = 16$

Part b: The median is the middle number in the list when the list is in numerical order. There are 16 numbers, so the median is the average of the 8th and the 9th numbers in the list. Both the 8th and the 9th numbers are 24, so the median is also 24.

Part c:  $((2 \times 8) + (4 \times 16) + (3 \times 24) + (3 \times 32) + (2 \times 40) + (1 \times 48) + (1 \times 56)) \div 16 = 27 \text{ oz.}$

OR

27 ounces; to find the mean, you have to add all of the numbers together and divide by the number of members.

Score Point 4

Sample 1

A) There are 16 students in the math class

How? I added up all the "Frequencies" because that is how many people drank that much water.

---

B) 8, 8, 16, 16, 16, 16, 24, 24, 24, 32, 32, 32, 40, 40, 48, 56  
Median 24

How? You put all the numbers in order, then go from each end until they meet in the middle.

---

C) Mean: 27

How? You add up all the numbers and divide by 16, because there is 16 numbers

Score Point 4

Sample 2

A) There are 16 students in the health class.  
 $2+4+3+3+2+1+1=16$

B) The median number of ounces of water consumed is 24 ounces.

~~8, 8, 16, 16, 16, 16, 24, 24, 24, 32, 32, 32, 40, 40, 48, 56~~

C) The mean number of ounces of water consumed is 27 ounces.

$$\frac{8+8+16+16+16+16+24+24+24+32+32+32+40+40+48+56}{16} = 432 \div 16 = \underline{27}$$

Score Point 3

Sample 1

a)  $2+4+5+3+2+1+1$   
 $5+5+6 = 16$  members

(b) 8, 8, 16, 16, 16, 16, 24, 24, 24, 32, 32, 32, 40, 40, 48, 56  
 24 oz

(c)  $16 \times 4$   

$$\begin{array}{r} 16 \\ 164 \\ + 72 \\ + 96 \\ + 80 \\ + 48 \\ + 56 \\ \hline 230 \end{array}$$
 230 oz

$16 \overline{) 368}$

Score Point 3

Sample 2

a)  $2+4+3+3+2+1+1 = 16$  students

b) 8 16 24 32 40 48 56  
 32 ounces

c)  $8+8+16+16+16+16+24+24+24+32+32+32+40+$   
 $40+48+56 = 432$   
 $27.00$  per student  
 $16 \overline{) 432}$

Score Point 2

Sample 1

2  
4  
3  
3  
2  
2  
+ 1  
15

- a) 15 people
- b) 32 median
- c) 32 mean

0	8
1	6
2	4
3	2
4	0
5	6

No. of	Fre.
8	2
16	4
24	3
32	3
40	2
48	1
Σ	15

8  
16  
24  
32  
40  
48  
56  
224

$224 \div 7 = 32$

Score Point 2

Sample 2

a.  $2+4+3+3+2+1+1 = \boxed{16 \text{ students}}$

$8 \cdot 2 + 16 \cdot 4 + 24 \cdot 3 + 32 \cdot 3 + 40 \cdot 2 + 48 + \cancel{66} \div 7 =$

$16 + 64 + 72 + 96 + 80 + 48 + 56 \div 7 =$

$432 \div 7 =$

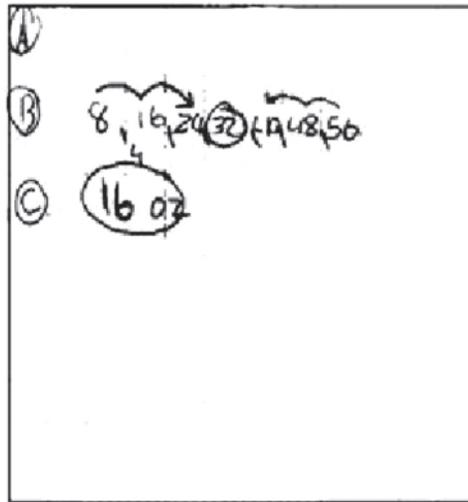
$\boxed{61.7 \text{ ounces} = \text{mean}}$

b.  $8, 8, 16, 16, 16, 16, \boxed{24, 24}, 24, 32, 32, 32, 40, 40, 48, 56$

$\boxed{24 = \text{median}}$

Score Point 1

Sample 1



Score Point 1

Sample 2

- a. 16 people. I found my answer by counting all the numbers in the Frequency list.
- b. 4 ounces. I found my answer by looking at the table and seeing which number is bigger in the frequency list.
- c. The mean number is 56 and the frequency is 1. I found my answer by looking at the table.

Score Point 0

Sample 1

a) 7 people cause each line is for one person and how much they consume

c)

# of oz	Frequency
8x2	16
16x4	64
24x3	72
32x3	96
40x2	80
48x1	40
56x1	56
<hr/>	
	60.6 oz

b) 16, 40, 56, 64, 72, 80, 96  
64 oz

Score Point 0

Sample 2

a) ⑦ There is one column per person and there are 7 columns.

total = mean  
# members

8.2	=	16
16.3	=	32
24.3	=	48
32.3	=	64
40.3	=	80
48.1	=	96
56.1	=	112
		<hr/>
		510
		<hr/>
		7

5.7 ounces

⑤ 16  
32  
48  
64  
80  
96  
112

There is no median because no #'s are the same